

REMARKS

Claims 1, 2, 4-8, 10-40 and 42 are pending in the application. Claims 3, 9 and 41 have been cancelled by previous amendments. Claims 1, 2, 10-40 and 42 are rejected. No claims have been amended, added or cancelled by this Response. Claims 1, 17, and 40 and 42 are independent claims.

As an initial matter, Applicant notes with thanks that the Examiner explicitly acknowledged the IDS filed on January 14, 2009. However, Applicant also notes that the Examiner returned a copy of the IDS filed on January 15, 2009 with the Office Action dated May 28, 2009 (implying that the references listed thereon have been considered), but the Examiner failed to explicitly acknowledge that the references have been considered. Thus, Applicant respectfully requests that the Examiner explicitly acknowledge that the references listed on the IDS filed on January 15, 2009 have been considered.

Proceeding now with a discussion of the rejections set forth in the Office Action, the Examiner rejects claims 1, 2, 4-8, 10-13 and 17 - 40 and 42 under 35 U.S.C. §103(a) as being unpatentable over Koyanagi (U.S. Pat. No. 6,525,415) in view of Hubner (U.S. Pat. No. 5,706,578).

Applicant submits that claims 1 and 17 are patentable over the combination of Koyanagi and Hubner cited by the Examiner since the combination neither describes nor suggests a conductive interface which forms at least part of an electrical communication path and secures together first and second device layers as called for in each of independent claims 1 and 17.

The Examiner equates microbumps 42A, 42B (Fig. 1 in Koyanagi) to the conductive interface recited in Applicant's independent claims 1 and 17.

The Examiner concedes that Koyanagi does not explicitly teach that microbumps 42A, 42B form at least part of an electrical communication path **and** secures together first and second device layers as called for in Applicant's independent claims 1 and 17 (see Office Action dated May 28, 2009 at page 6).

The Examiner asserts, however, that Hubner "...teaches an analogous structure of that disclosed by Koyanagi including a conductive interface have a solder 25 securing a first and second device" and the Examiner concludes that it would have been obvious to one of ordinary skill in the art to make the first conductive interface disclosed by Koyanagi including a solder as disclosed by Hubner to provide a firm joint between the first and the second device layer..." (see Office Action dated May 28, 2009 at page 6.)

As an initial matter, Applicant does not agree that the structures described in the Koyanagi and Hubner references are "analogous" as asserted by the Examiner. Even a cursory comparison of the structure shown in Fig. 1 in Koyanagi to the structure shown in Fig. 1 of Hubner compels this conclusion. Specifically, the structure shown in Fig. 1 in Koyanagi (and the corresponding text) uses a resin epoxy between two insulating layers to secure two separate substrates while the structure shown in Fig. 1 of Hubner (and the corresponding text) shows joining of substrates by soldering two metal surfaces of the substrates.

Furthermore, and as already made of record in this case, despite the Examiner's assertions to the contrary, it is clear from Koyanagi that epoxy resin (e.g. epoxy resin 50 in Fig. 1 of Koyanagi) is used to secure the substrates and that the Koyanagi microbumps 42A, 42B are not used for that purpose.

Thus, it does not following that it would have been obvious to add the Hubner solder technique to the Koyanagi epoxy resin technique as asserted by the Examiner. Koyanagi neither describes nor mentions in any way a need to fortify the joint between the two substrates. This is not surprising since epoxy resin is preferred precisely because use of epoxy resins results in strong bonding between two substrates.

Moreover, the Hubner technique requires a very specific fabrication process (See Hubner at col. 6 line 63 – col. 7 line 27) including solder re-flow at a high temperature (e.g. 1200° C as noted in Hubner at col. 6 line 67) and it is not at all clear that the Hubner technique could be used to fabricate the structure of Koyanagi which utilizes an epoxy resin (as is notoriously well-known, many epoxy resins are cured at ambient temperatures and while some epoxy resins may benefit from some heating during the cure period, Applicant is not aware of epoxy resins which benefit from exposure to cure temperatures of 1200° C as called for in the Hubner technique).

Accordingly, Applicant submits that it is improper to combine the references in the manner suggested by the Examiner since the combination suggested by the Examiner would either not result in the structure recited in claims 1 and 17 or the combination suggested by the Examiner would result in an inoperable structure.

With respect to independent claims 40, 42 Koyanagi likewise fails to describe or suggest a conductive **bonding** interface segment disposed between two wafers and which also provides electrical connections between at least some semiconductor elements of the first and second wafers as called for in each of independent claims 40 and 42.

Neither Koyanagi nor Hubner describe or suggest a conductive **bonding** interface segment. **Nor does the Examiner assert they do.** Accordingly, it is not possible to arrive at the structure recited in claims 40 and 42. Thus, Applicant submits that claims 40 and 42 are each patentable over the combination of references cited by the Examiner.

Furthermore, for the reasons discussed above in conjunction with independent claims 1 and 17, Applicant submits that it is improper to combine the references in the manner suggested by the Examiner since the combination suggested by the Examiner would either not result in the structure recited in claims 40 and 42 or the combination suggested by the Examiner would result in an inoperable structure.

For at least the above reasons, Applicant submits that claims 1, 17, 40 and 42 are patentable over the combination suggested by the Examiner and Applicant also submits that the rejection of claims 1, 17, 40 and 42 under 35 U.S.C. §103(a) is improper and should be removed.

Each of claims 2, 4-8, 10-13 and 17-39 depend either directly or indirectly from one of independent claims 1, 17, 40 and 42. Thus, Applicant submits that each of claims 2, 4-8, 10-13 and 17 – 39 are patentably distinct over the cited references taken alone or in combination generally for the reasons discussed above in conjunction with independent claims 1, 17, 40 and 42.

Accordingly, Applicant submits that claims 1, 2, 4-8, 10-13 and 17 - 40 and 42 are patentable over the combination suggested by the Examiner and Applicant also submits that the rejection of claims 1, 2, 4-8, 10-13 and 17 - 40 and 42 under 35 U.S.C. §103(a) is improper and should be removed.

The Examiner rejects claims 14-16 under 35 U.S.C. §103(a) as being obvious in view Koyanagi (U.S. Pat. No. 6,525,415) in combination with Hubner (U.S. Pat. No. 5,706,578) and further in view of Nulman (U.S. Pat. No. 5,904,562).

Claims 14-16 each depend either directly or indirectly from base claim 1 and thus include each of the limitations of base claim 1. Accordingly, claims 14-16 each call for a conductive interface, which forms at least part of an electrical communication path and secures together the first and second device layers.

As discussed above, Koyanagi neither describes nor suggests a conductive interface that forms at least part of an electrical communication path and secures together the first and second device layers. Nulman also fails to describe or suggest such an element and as discussed above, the combination of Koyanagi and Hubner cannot result in the structure recited in claim 1. Thus, the combination of Koyanagi, Hubner and Nulman cannot render obvious claims 14 –16 since the combination of the references neither describes nor suggests a conductive interface which

forms at least part of an electrical communication path and secures together the first and second device layers as called for in each of claims 14 –16.

Accordingly, in view of the above Remarks, Applicants submit that Claims 1, 2, 4-8, 10-40 and 42 and the entire case are in condition for allowance and should be sent to issue and such action is respectfully requested.

The Examiner is respectfully invited to telephone the undersigning attorney if there are any questions regarding this Response or this application.

Respectfully submitted,

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